

(12) UK Patent Application (19) GB (11) 2 158 393 A

(43) Application published 13 Nov 1985

(21) Application No 8412057

(22) Date of filing 11 May 1984

(71) Applicant
Black & Decker Inc (USA-Delaware),
Drummond Plaza Office Park, 1423 Kirkwood
Highway, Newark, Delaware 19711, United States of
America

(72) Inventor
Daniel Bone

(74) Agent and/or Address for Service
Abel & Imray,
Northumberland House, 303-306 High Holborn,
London WC1V 7LH

(51) INT CL⁴
B27B 19/09

(52) Domestic classification
B5L 104 DX K

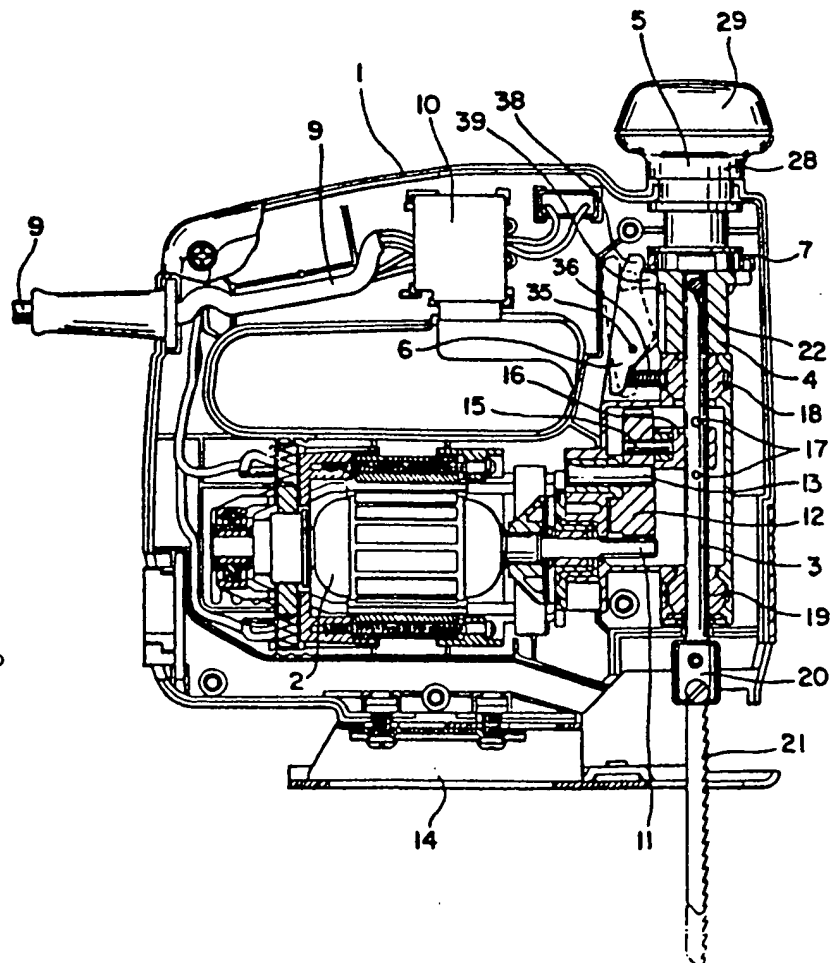
(56) Documents cited
GB A 2053795 EP A1 0124198

(58) Field of search
B5L

(54) Scroller jig saw

(57) A scroller jig saw includes: a saw blade drive shaft (3) mounted for reciprocating movement relative to the housing (1) along a longitudinal axis of the shaft and rotation about the axis; a motor (2) in the housing (1) drivingly connected to the saw blade drive shaft (3) for reciprocating the shaft along the axis; a scrolling control member (5) accessible to an operator and rotatably coupled to the saw blade drive shaft (3) for rotating the shaft, and releasable locking means for locking the saw blade drive shaft against rotation. The releasable locking means comprises a pivotally mounted locking lever (6) pivotable between a first position in which the saw blade drive shaft (3) is locked against rotation and a second position in which the shaft is free to rotate, the locking lever (6) being resiliently biased into the first position. A locking control member (7) accessible to an operator and movable between a scrolling position in which the locking lever (6) is held in the second position and a locking position in which the locking lever is free to move into the first position.

FIG. 2



GB 2 158 393 A

1/4

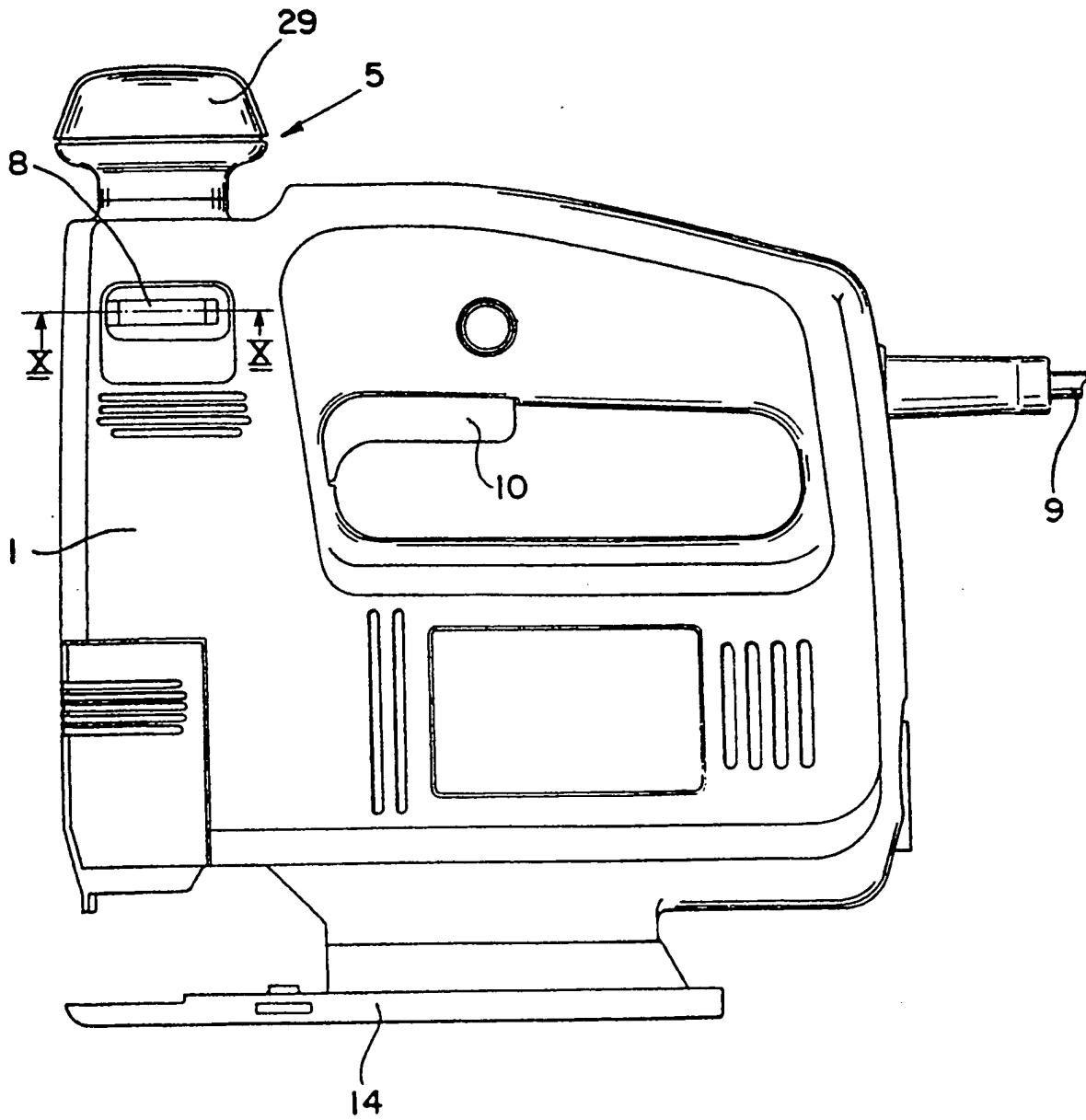
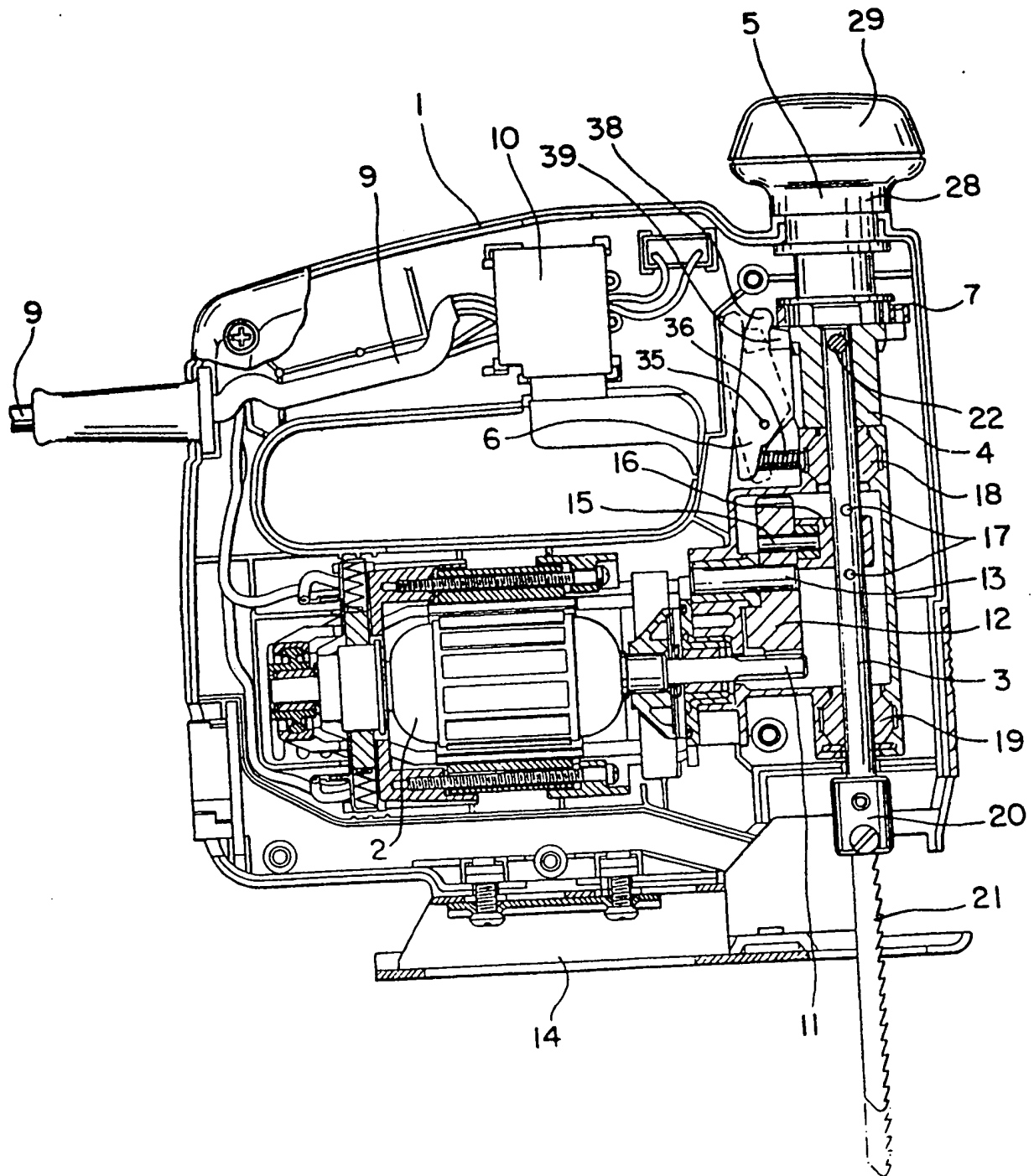
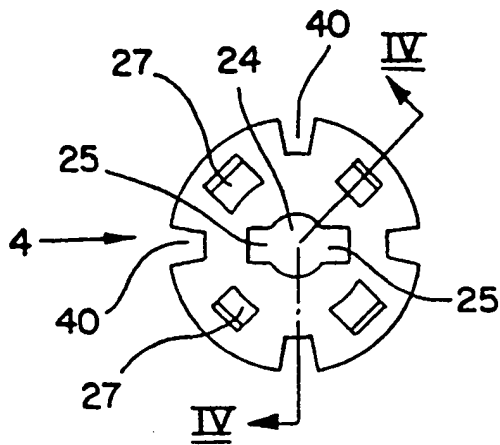
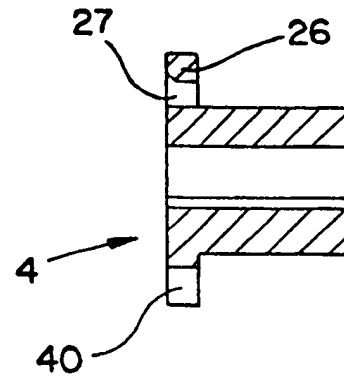
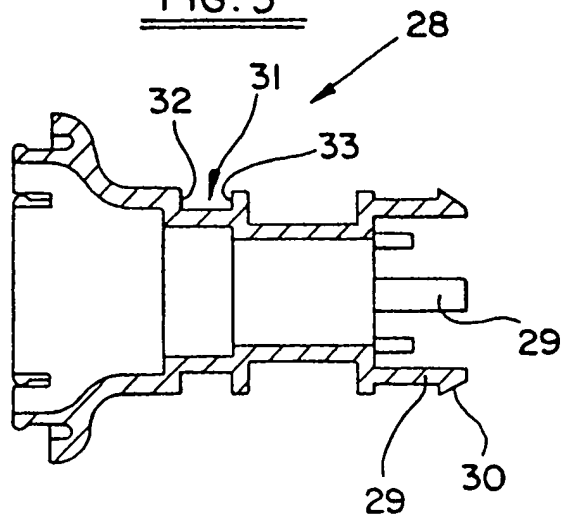
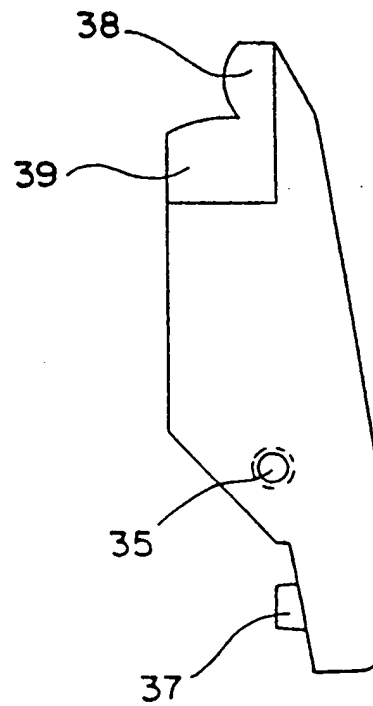
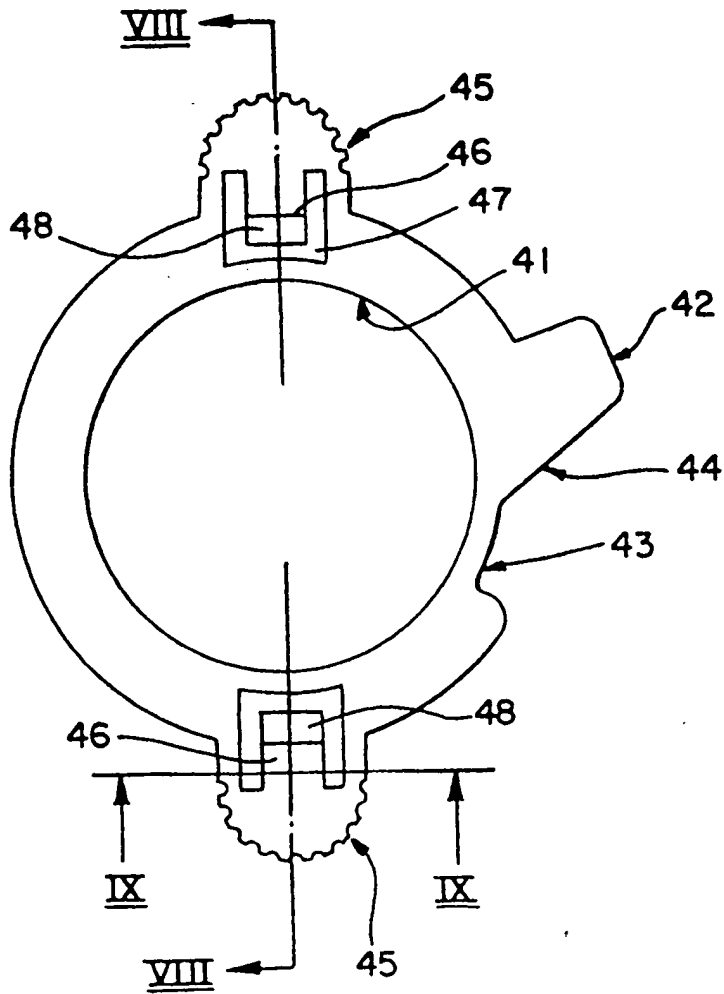
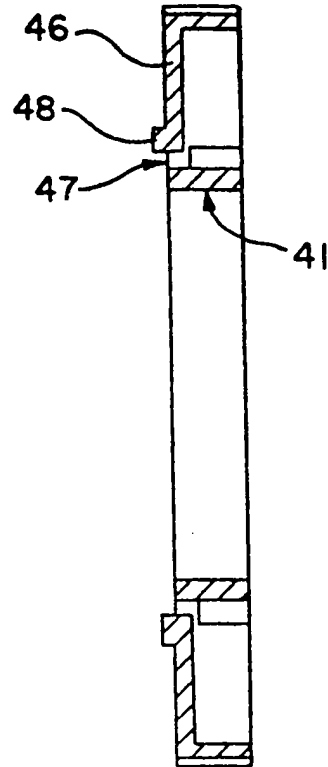
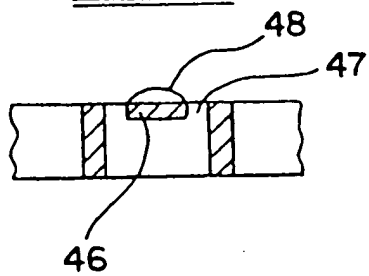
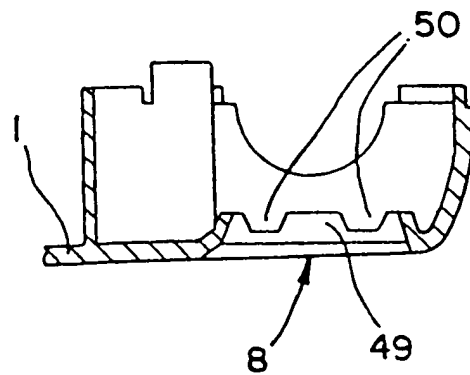
FIG. 1

FIG. 2

3/4

FIG. 3FIG. 4FIG. 5FIG. 6

4/4

FIG. 7FIG. 8FIG. 9FIG. 10

SPECIFICATION

Scroller jig saw

- 5 This invention relates to a scroller jig saw.
It is desirable for a scroller jig saw to be able to operate in both a scrolling and a non-scrolling mode. In the scrolling mode the operator must be able to control rotation of the saw blade about its longitudinal axis while in the non-scrolling mode the saw blade must be locked against such rotation. It is important that the saw blade can be locked in the conventional position, namely with the cutting edge of the saw blade facing directly forwards, but it is also desirable that the saw blade should be lockable in other angular positions.
- A variety of mechanisms for achieving the controls mentioned above have been proposed and examples of such mechanisms are to be found in U.S. patent specifications Nos. 3494390, 3729822 and 4283855. While various mechanisms have been proposed there is still a need for a simple and reliable mechanism which facilitates switching between scrolling and non-scrolling modes.
- It is an object of the invention to provide an improved form of scroller jig saw.
- 30 According to the invention there is provided a scroller jig saw including:
a saw blade drive shaft mounted for reciprocating movement relative to the housing along a longitudinal axis and rotation about the axis,
35 a motor in the housing drivingly connected to the saw blade drive shaft for reciprocating the shaft along the axis,
a scrolling control member accessible to an operator and rotatably coupled to the saw blade drive shaft for rotating the shaft, and
40 releasable locking means for locking the saw blade drive shaft against rotation,
wherein the releasable locking means comprises a pivotally mounted locking lever pivotable between a first position in which the saw blade drive shaft is locked against rotation and a second position in which the shaft is free to rotate, the locking lever being resiliently biased into the first position, and a
45 locking control member accessible to an operator and movable between a scrolling position in which the locking lever is held in the second position and a locking position in which the locking lever is free to move into
50 the first position.
- The locking control member may comprise a rotatable cam member mounted for rotation about the axis of the saw blade drive shaft and including a cam surface engaging the
60 locking lever.
- The locking control member may include at least one lug projecting through the housing. The lug may project through a side of the housing.
- 65 The saw blade drive shaft may be mounted in a scrolling control assembly, including the scrolling control member, for reciprocation relative thereto but rotatably coupled thereto. The scrolling control assembly may be mounted for rotation about the axis of the saw blade drive shaft. The locking control member may be mounted on the scrolling control assembly.
- 70 In one embodiment of the invention the locking lever is pivotally mounted intermediate its ends, is resiliently biased by a compression spring at one end, is engageable with the locking control member at the other end and is engageable with a member rotatably coupled to the saw blade drive shaft between the other end and the pivotal mounting.
- By way of example, an embodiment of the invention will now be described with reference to the accompanying drawings, of which:
85 Fig. 1 is a side view of a scroller jig saw embodying the invention,
Fig. 2 is a sectional view from the opposite side of the saw,
Fig. 3 is an end view of a control block forming a part of a scrolling control assembly for the saw,
90 Fig. 4 is a sectional view along the lines IV—IV of Fig. 3,
Fig. 5 is a sectional view of another part of the scrolling control assembly for the saw,
95 Fig. 6 is a side view of a locking lever forming a part of a releasable locking means for the scrolling mechanism of the saw,
Fig. 7 is a plan view of a cam forming another part of the releasable locking means,
100 Fig. 8 is a sectional view along the lines VIII—VIII of Fig. 7,
Fig. 9 is a sectional view along the lines IX—IX of Fig. 7, and
105 Fig. 10 is a sectional view along the lines X—X of Fig. 1 of a part of the housing only.
- Referring first to Figs. 1 and 2, the scroller jig saw shown in the drawings includes a housing 1 of clam shell construction on the bottom of which a shoe is mounted. Received in the housing 1 are, *inter alia*, an electric motor 2, a saw blade drive shaft 3 arranged to be reciprocated by the motor as will be described in more detail later, a scrolling control assembly including a control block 4 and a control knob 5 projecting externally of the casing, and a releasable locking means for locking the scrolling control assembly consisting of a spring biased locking lever 6 and a cam 7 rotatably mounted on the scrolling control assembly and accessible to an operator by virtue of openings 8 on opposite sides of the housing 1.
- Power is supplied to the motor 2 through a cable 9 via a trigger switch 10. The motor 2 has an armature shaft which carries a pinion 11 on its end, the pinion 11 meshing with a gear 12 fixed to a rotatably mounted spindle 13. The gear 12 carries an eccentric pin 15 which is slideably mounted in a horizontal

track of a yoke 16 having a central bore in which the saw blade drive shaft 3, which is of circular cross-section, is received. Longitudinal relative movement of the shaft 3 relative to the yoke 16 is prevented by pins 17 which

pass through the shaft 3 and project therefrom on either side of the yoke 16. The shaft 3 is mounted in upper and lower bearings 18, 19 and its lower end carries a saw blade holder 20 in which a saw blade 21 (not shown in Fig. 1) is mounted. Adjacent the top end of the shaft 3 a transverse pin 22 passes through the shaft and projects a short distance out of the shaft on each side. The upper end of the shaft 3 is slidably received in a non-circular bore of the control block 4. Referring also to Figs. 3 and 4, it will be seen that the control block 4 has a bore with a central circular portion 24 and diametrically opposite extensions 25 in which the ends of the pin 22 are received. Thus the shaft 3 is able to reciprocate longitudinally relative to the block 4 but is locked against rotation relative to the block.

The block 4 carries a peripheral flange 26 at its upper end and this flange is provided with four apertures 27 equispaced around the flange and also with four notches 40 in its periphery equispaced between the apertures 27. The control knob 5 is formed in two parts, namely a lower main part 28 and an upper cap part 29 which is snap fitted onto the part 28. The lower part 28 is shown in Fig. 5 and at its bottom end carries four legs 29 which snap fit into the apertures 27 on the block 4. The legs 29 carry feet 30 which project on the lower side of the flange 26 and retain the control knob on the control block. Intermediate the ends of the part 28 a cylindrical bearing portion 31 defined between opposing shoulders 32 and 33 is provided. The bearing portion 31 mounts the control knob 5 in a correspondingly sized opening in the top of the housing 1 for rotation about its longitudinal axis, which is also the longitudinal axis of the shaft 3.

The locking lever 6, shown in Figs. 2 and 6 is pivotally mounted on a pivot 35 and is biased by a compression spring 36 compressed between a part of the housing 1 adjacent the upper bearing 18 and the lower end of the lever 6. A boss 37 formed on the lever 6 locates the spring relative to the lever. At its top end the lever 6 has a curved nose

38 which is engageable with the cam 7 as will be described below. Immediately below the nose 38 is a latch part 39 and the cross-section of this part is arranged to match the cross-section of each of the notches 40 so that the latch part 39 is engageable with each of the notches. In Fig. 2 the lever 6 is shown in solid outline in the position to which it is biased by the spring 36; in this position the latch part 39 is engaged with one notch 40 on the control block 4.

The cam 7 shown in Figs. 7 to 9 has a central bore 41 which receives the upper parts of the legs 29 and thus mounts the cam rotatably on the scroller control assembly. A pair of radially extending lugs 45 are formed on diametrically opposite parts of the cam and extend through the openings 8 in the housing 1. On the side of the cam facing the locking lever the peripheral surface of the cam 7 is shaped to define a raised face 42, a recessed face 43 and an interconnecting sloping face 44, these parts together defining a cam surface.

Formed in the top surface of the cam 7 at the location of each of the lugs 45 is a tongue 46 disconnected from the rest of the cam 7 on three sides by a slot 47 and carrying a pip 48 protruding above the general top surface of the cam. Referring now also to Fig. 10, it will be seen that immediately inside each of the openings 8 and along the top of the opening a wall 49 is provided with a pair of recesses 50 formed therein. The cam 7 is so positioned relative to the housing 1 that the general surface of the top of the cam 7 is immediately adjacent the wall 49 and, with the lug 45 projecting centrally through the opening 8, the pip 48 is pressed downwardly into the body of the cam. If the lug 45 is moved to one side or the other of the opening 8, however, the pip 48 moves into a recess 50. Substantial movement of the cam further to one side is prevented by engagement of the lugs 45 with the sides of the openings 8. The two positions of the cam 7 in which the pips 48 are received in the recesses 50 define the two working positions of the cam and it will be appreciated that the cam "clicks" into both these positions. In one of these positions (the locking position) which is shown in Fig. 2 the recessed face 43 of the cam 7 is aligned with the nose 38 of the locking lever 6 and the locking lever is free to adopt the position shown in solid outline in Fig. 2. When the cam 7 is rotated to the other position (the scrolling position), however, the nose 38 comes into camming engagement first with the sloping face 44 of the cam and then with the raised face 42 and the locking lever 6 is moved to the position shown in dotted outline in Fig. 2, in which the latch part 39 of the lever is spaced from the control block 4 and the scrolling control assembly is therefore able to rotate.

If an operator actuates the switch 10 with the parts in the position shown in Fig. 2, then the saw operates as follows. The pinion 11 is driven by the motor 2 and in turn rotates the gear 12. Rotation of the gear 12 causes orbital movement of the pin 15; the horizontal component of this orbital movement is accommodated by the pin sliding in the yoke 16 while the vertical component is translated into reciprocating movement of the shaft 3 in the bearings 18, 19 and reciprocating movement

of the saw blade 21. While the saw blade is rotatably mounted in the bearings it is rotatably locked relative to the control block 4 and this in turn is locked against rotation by the engagement of the latch part 39 of the lever 6 in one notch 40 of the control block 4. Thus the saw blade 21 is locked in the angular position shown in Fig. 2 and will not rotate even if a user attempts to rotate the control knob 5 (which also will not rotate). In this non-scrolling mode the saw operates as a conventional jig saw.

If now an operator "clicks" the cam 7 over to its other working position by gripping the free ends of the lugs 45 projecting through the openings 8, the top end of the locking lever 6 is cammed outwardly against the bias of the spring 36 and the latch part 39 is withdrawn from the notch 40. The control block 4 is then free to rotate and therefore the shaft 3 and saw blade 21 are also free to rotate. The operator can control rotation of these parts by means of the control knob 5 on the top of the tool housing. This is the scrolling mode of the tool.

If an operator wishes to revert to a non-scrolling mode he first rotates the control knob 5 until the saw blade 21 is in approximately the correct orientation and then "clicks" the cam 7 back to the position shown in Fig. 2. Provided one of the notches 40 is approximately aligned with the locking lever 6, the lever will also revert to the position shown in Fig. 2 and, as it enters the notch 40 which, as can be seen in Fig. 3, is slightly tapered, the control block 4 will be rotated slightly to bring it into exact alignment with the latch part 39, which is correspondingly tapered. If none of the notches 40 are approximately aligned with the lever 6, the latch part 39 of the lever 6 will be biased into contact with the periphery of the control block 4 and the saw will remain in the scrolling mode until the scroller control assembly is rotated sufficiently to bring one of the notches 40 into approximate alignment with the lever 6. It will be appreciated that the four notches 40 on the control block 4 provide four orientations, spaced 90° apart from one another, in which the saw blade can be locked.

CLAIMS

1. A scroller jig saw including:
 - a saw blade drive shaft mounted for reciprocating movement relative to a housing along a longitudinal axis of the shaft and rotation about the axis,
 - a motor in the housing drivingly connected to the saw blade drive shaft for reciprocating the shaft along the axis,
 - a scrolling control member accessible to an operator and rotatably coupled to the saw blade drive shaft for rotating the shaft, and
 - releasable locking means for locking the saw blade drive shaft against rotation,

wherein the releasable locking means comprises a pivotally mounted locking lever pivotable between a first position in which the saw blade drive shaft is locked against rotation and a second position in which the shaft is free to rotate, the locking lever being resiliently biased into the first position, and a locking control member accessible to an operator and movable between a scrolling position in which the locking lever is held in the second position and a locking position in which the locking lever is free to move into the first position.

2. A saw as claimed in claim 1 in which the locking control member comprises a rotatable cam member mounted for rotation about the axis of the saw blade drive shaft and including a cam surface engaging the locking lever.

3. A saw as claimed in claim 1 or 2 in which the locking control member includes at least one lug projecting through the housing.

4. A saw as claimed in claim 3 in which the lug projects through a side of the housing.

5. A saw as claimed in claim 4 in which the locking control member has two lugs projecting through opposite sides of the housing.

6. A saw as claimed in any preceding claim in which the saw blade drive shaft is mounted in a scrolling control assembly, including the scrolling control member, for reciprocation relative thereto but for rotation therewith.

7. A saw as claimed in claim 6 in which the scrolling control assembly is mounted for rotation about the axis of the saw blade drive shaft.

8. A saw as claimed in claim 6 or 7 in which the locking control member is mounted on the scrolling control assembly.

9. A saw as claimed in any of claims 6 to 8 in which the locking lever engages the scrolling control assembly in the first position.

10. A saw as claimed in any preceding claim in which the locking lever is pivotally mounted intermediate its ends, is resiliently biased by a compression spring at one end, is engageable with the locking control member at the other end, and is engageable with a member coupled to the saw blade drive shaft between the other end and the pivotal mounting.

11. A saw as claimed in any preceding claim in which the scrolling control member comprises a knob projecting externally from the top of the housing and having a plurality of legs which extend parallel to the axis of the saw blade drive shaft and couple the scrolling control member to the saw blade drive shaft and the locking control member is rotatably mounted on the scrolling control member.

12. A scroller jig saw comprising:

- a housing;
- a saw blade drive shaft mounted in the housing for reciprocating movement along a longitudinal axis of the shaft and for rotation about the axis;

- a motor mounted in the housing and driv-
 ingly connected to the shaft for reciprocating
 the shaft along said axis;
 a block in which the drive shaft is engaged
 5 for reciprocation relative thereto along said
 axis and for rotation therewith about said axis;
 a manually operable knob rotatably
 mounted on the housing and connected to the
 block for manual rotation thereof;
 10 the block having a plurality of notches in a
 peripheral part thereof;
 a lever pivotally mounted in the housing
 and spring biased to engage in a selected one
 of the plurality of notches to lock the block
 15 against rotation about said axis;
 a cam member rotatably mounted about
 said axis and having a protrusion extending
 through the housing for manual rotation of
 the cam member between first and second
 20 positions;
 the cam member having a cam surface
 cooperative with the lever and acting upon the
 lever in said first position to pivot the lever
 out of engagement with the notches to enable
 25 the block and drive shaft to be rotated by the
 knob and allowing the lever to move into said
 second position for locking the block and the
 saw blade drive shaft against rotation.
13. A scroller jig saw, comprising:
 30 a housing having a top and two sides;
 a saw blade drive shaft of circular cross-
 section mounted in spaced apart bearings in
 the housing for reciprocating movement along
 a longitudinal axis of the drive shaft and for
 35 rotation about the axis;
 a flanged block having a bore therethrough
 of non-circular cross-section, the drive shaft
 engaging in the bore for reciprocating move-
 ment therein;
 40 a pin extending transversely through the
 drive shaft cooperating with the bore to pre-
 vent rotation of the drive shaft therein;
 a manually operable member rotatably
 mounted on the housing and connected to the
 45 block for manual rotation thereof;
 a lever pivotally mounted in the housing
 adjacent the block, an end of the lever being
 spring biased to engage the flange to lock the
 block and the saw blade drive shaft against
 50 rotation;
 a ring-like member having a cam surface on
 one side thereof and being rotatably mounted
 on the manually operable member at a loca-
 tion inside the housing;
 55 the ring-like member being rotatable be-
 tween a first position, in which the cam
 surface engages the lever and pivots the lever
 out of engagement with the flange to enable
 the block and the drive shaft to be rotated,
 60 and a second position in which the cam
 surface allows the lever to be spring biased
 into engagement with the flange for locking
 the block and the drive shaft against rotation;
 and
 65 the ring-like member having diametrically

opposed protrusions extending outwardly
 through openings in the two sides of the
 housing adjacent the top of the housing, the
 protrusions being manually accessible for rota-
 70 tion of the ring-like member between the first
 and second positions.

14. A scroller jig saw substantially as herein
 described with reference to and as illustrated
 by the accompanying drawings.

Printed in the United Kingdom for
 Her Majesty's Stationery Office, Dd 8818935, 1985, 4235.
 Published at The Patent Office, 25 Southampton Buildings,
 London, WC2A 1AY, from which copies may be obtained.